

What is claimed is:

1. A substrate holding apparatus which holds a flat-like substrate, comprising:

a base member; and

a plurality of projecting support members disposed on said base member such that the supporting members are arranged like a triangular lattice and distal end portions thereof are positioned on substantially the same plane, wherein

the substrate is to be placed on said plurality of support members.

2. A substrate holding apparatus as recited in claim 1, further comprising:

a suction mechanism which sucks the substrate placed on the plurality of support members toward said base member side.

3. A substrate holding apparatus as recited in claim 1, further comprising:

a ring-like closed protrusion formed on said base member so as to surround said plurality of support members, and

a gas suction portion which sucks gas inside the protrusion.

4. A substrate holding apparatus as recited in claim 2, wherein

said plurality of support members are disposed like a lattice of equilateral triangles each having one side with a length "a" [m], and

when a suction force per unit length is set as "p" [N/m] in the case of sucking the substrate toward the base member side, an allowable deformation amount is set as " δ_{max} " [m] in the case of sucking the substrate, Young's modulus E of the substrate is set as E [Pa], and a thickness of the substrate is set as "t" [m], the length "a" of the equilateral triangle and the suction force "p" satisfy the following condition:

$$p \cdot a^4 \leq 18 \cdot E \cdot t^3 \cdot \delta_{max}$$

5. A substrate holding apparatus as recited in claim 4, wherein

the substrate is a semiconductor substrate having a diameter of approximately 300mm, and the one side of the equilateral triangle has a length of 1mm-3mm.

6. A substrate holding apparatus as recited in claim 1, wherein

said base member is coated on a surface thereof except for a part of a mounting surface for the substrate, said part being different from a contact surface with the substrate.

7. A substrate holding apparatus as recited in claim 1, further comprising:

a suction mechanism which is connected to said base member and which sets a suction force after the substrate is placed to be weaker than a suction force when the substrate is placed on said plurality of support members.

8. A substrate holding apparatus which holds a flat-like substrate, comprising:

a base member; and

a plurality of projecting support members disposed on said base member such that distal end portions thereof are positioned on substantially the same plane, wherein

a conductive material is coated on a predetermined area including a contact surface of the support member with the substrate, and an area which is not coated with the conductive material is partially formed in the

predetermined area.

9. A substrate holding apparatus as recited in claim 8, wherein said base member and said plurality of support members are made of a non-conductive material having a low thermal expansion coefficient.

10. A substrate holding apparatus which holds a flat-like substrate, comprising:

a base member having a plurality of projecting support members, distal end portions thereof which are to contact the substrate being positioned on substantially the same plane, said base member having a coating on a surface thereof except for a part of a mounting surface for the substrate, and said part being different from a contact surface with the substrate, and

a suction mechanism which is connected to said base member and which sucks gas between the substrate and said base member.

11. A substrate holding apparatus as recited in claim 10, wherein

said base member is made of a non-conductive material different from the coating layer on the surface and having

a low thermal expansion coefficient.

12. A substrate holding apparatus which holds a flat-like substrate, comprising:

a base member;

a plurality of projecting support members which are disposed on the base member such that distal end portions thereof are positioned on substantially the same plane,

a ring-like closed protrusion formed on said based member so as to surround said plurality of support members; and

a gas suction portion which sucks gas inside the protrusion, wherein

a suction force after the substrate is placed on the plurality of support members is set weaker than a suction force when the substrate is placed on the plurality of support members.

13. A substrate holding apparatus as recited in claim 12, wherein a gas suction force is set weaker at least when the substrate is processed than when the substrate is placed.

14. A substrate holding apparatus as recited in claim 12, further comprising:

an air supply portion which blows gas into the inside of the ring-like protrusion when the substrate is taken off from said plurality of support members.

15. An exposure apparatus which exposes a second object with an exposure beam via a first object, comprising:

said substrate holding apparatus as recited in claim 1, wherein said substrate holding apparatus holds the second object as the substrate.

16. An exposure apparatus which illuminates a first object with an exposure beam, and exposes a second object with the exposure beam via the first object, comprising:

a holder having a plurality of projecting support members disposed like a triangular lattice such that distal end portions thereof which are to contact the second object are positioned on substantially the same plane, and

a stage system including a movable body in which said holder is provided.

17. An exposure apparatus as recited in claim 16, wherein

said stage system respectively moves the first and second objects relative to the exposure beam in order to scan and expose the second object with a beam generated from

the first object by irradiation of the exposure beam.

18. An exposure apparatus as recited in claim 17, wherein said plurality of support members are disposed like a lattice of isosceles triangles each having a base parallel with a second direction crossing a first direction along which the second object is moved at the scanning and exposure.

19. An exposure apparatus as recited in claim 18, wherein the isosceles triangle has a height direction parallel with the first direction and has a height longer than the base.

20. An exposure apparatus as recited in claim 17, wherein said plurality of support members which are disposed like a lattice of parallelograms each having two sides parallel with a second direction crossing a first direction along which the second object is moved at the scanning and exposure.

21. An exposure apparatus as recited in claim 17, wherein said plurality of support members which are disposed like a lattice of rhombuses each having a first width with

respect to a first direction along which the second object is moved and a second width with respect to a second direction crossing the first direction, the first width being larger than the second width.

22. An exposure apparatus as recited in claim 16, wherein said holder is coated on a surface thereof except for a part of a mounting surface for the second object, said part being different from a contact surface with the second object.

23. An exposure apparatus as recited in claim 16, further comprising:

a suction mechanism which is connected to said holder and which sets a suction force after the second object is placed to be weaker than a suction force when the second object is placed on said plurality of support members.

24. An exposure apparatus which illuminates a first object with an exposure beam, and exposes a second object by the exposure beam via the first object, comprising:

a holder having a plurality of projecting support members with distal end portions thereof which are to contact the second object being positioned on substantially the same

plane, said holder being coated on a surface thereof except for a part of a mounting surface for the second object and said part being different from a contact surface with the second object, and

a stage system including a movable body in which said holder is provided.

25. An exposure apparatus as recited in claim 24, further comprising:

a suction mechanism which is connected to said holder and which sets a suction force after the second object is placed to be weaker than a suction force when the second object is placed on said plurality of support members.

26. An exposure apparatus which illuminates a first object with an exposure beam, and exposes a second object by the exposure beam via the first object, comprising:

a holder having a plurality of projecting support members with distal end portions thereof which are to contact the second object being positioned on substantially the same plane, and

a suction mechanism which is connected to said holder and which sets a suction force after the second object is placed to be weaker than a suction force when the second

object is placed on said plurality of support members.

27. An exposure apparatus as recited in claim 26, wherein said suction mechanism includes an air supply portion which supplies air between the substrate and said holder when the substrate is taken off from the plurality of support members.